



Flow Boiling & Condensation Experiment

Problem Statement

- Reduced gravity condensation heat transfer data and models virtually nonexistent.
- Parabolic flight data will be used to develop phenomenological understanding, empirical correlations and theoretical models.
- Proposed research aims to develop a facility for International Space Station (ISS) to serve as primary platform for obtaining two-phase flow and heat transfer data in microgravity.

Technology Development Team

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Proposed Flight Experiment

Experiment Readiness:

- Entire facility is ready and it has previously flown in May 2012

Test Vehicles:

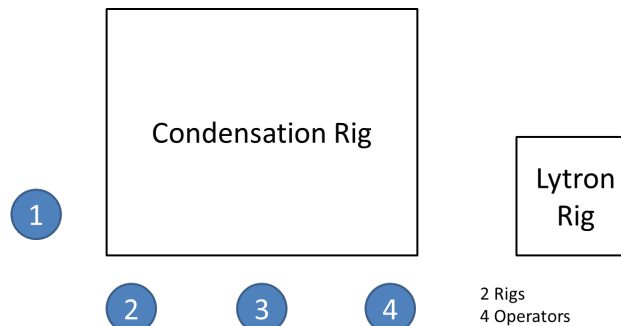
- Parabolic aircraft

Test Environment:

- Mostly microgravity, with few Lunar and Martian gravity conditions.

Test Apparatus Description:

- Condensation Facility has two rigs (Condensation rig and Lytron rig) and requires four operators.



Technology Maturation

- Current TRL for condensation heat transfer data and models for microgravity is 3.
- Parabolic flight data in short duration reduced gravity and model development will advance the TRL to 4-5 and long duration will advance the technology to TRL 6 or higher.
- A microgravity experiment on the ISS for Flow Boiling and Condensation is planned for 2017 and there is no specific deadline to mature the technology to TRL 6 or higher.

Objective of Proposed Experiment

- Flow condensation facility enables study of spatial development of condensation flow and heat transfer regimes in microgravity.
- Flight data will be used to investigate the influence of microgravity on condensation flow regimes, pressure drop, heater transfer coefficient and interfacial wave structure in annular condensation.